CLAIMS

I claim:

1. An apparatus for sensing a proportion of a gas in a gas mixture comprising:

a sampling element slidably engaged with a sensor element;

said sensor element having a sensing chamber therein with an inlet passage and an outlet passage formed in said sensor element wherein said inlet passage and said outlet passage in communication with said sensing chamber and externally to said sensor element;

a first detector positioned in said sensing chamber with a first pair of external contacts passing through said sensor element and terminating externally thereto;

said sensor element having a reference chamber therein with a second detector positioned therein and a second pair of external contacts passing through said sensor element terminating externally thereto; and

said sampling element having a sample chamber therein with said sensor element forming a portion of said sample chamber, said inlet passage having an inlet open end positioned in said sample chamber, and a gas inlet port in communication with said sample chamber and eternally to said sampling element.

2. The apparatus as in claim 1 wherein :

said inlet passage having an inlet open end positioned to be open to said sample chamber when said sampling element is in an open position and said inlet open end is closed to said sample chamber when said sampling element is in a closed position; and

said outlet passage having an outlet open end positioned in the environment when said sampling element is in said open position and said outlet open end is closed to the environment when said sampling element is in said closed position.

3. The apparatus as in claim 1 wherein said first detector and said second detector are formed as a platinum thin film resistive element and said first pair of external contacts and said second pair of external contacts are connected to an electrical conductivity measuring device.

4. The apparatus as in claim 3 wherein said electrical conductivity measuring device is a Wheatstone bridge.

5. The apparatus as in claim 1 wherein said sensor element having an upper portion for slidable insertion in said sample chamber and a lower portion containing said sensing chamber and said reference chamber.

6. The apparatus as in claim 1 wherein an O-ring is used to inhibit flow of gas between said sample chamber internal wall and said sensor element external surface when in slidable engagement.

7. An apparatus for sensing a proportion of a gas in a gas mixture comprising:

a sampling element engaged with a sensor element wherein a gas porous permeable membrane is disposed between said sampling element and said sensor element;

said sensor element having a sensing chamber with an inlet open end;

a first detector positioned in said sensing chamber with a first pair of external contacts passing through said sensor element and terminating externally thereto;

said sensor element having a reference chamber therein with a second detector positioned therein and a second pair of external contacts passing through said sensor element terminating externally thereto; and

said sampling element having a sample chamber therein in fluid communication with said sensing chamber through said gas porous permeable membrane, and a gas inlet port and an outlet passage in communication with said sample chamber and eternally to said sampling element.

8. The apparatus as in claim 7 wherein said first detector and said second detector are formed as a platinum thin film resistive element and said first pair of external contacts and said second pair of external contacts are connected to an electrical conductivity measuring device.

9. The apparatus as in claim 8 wherein said electrical conductivity measuring device is a Wheatstone bridge.